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10/720,527	11/25/2003	Jen-Jiang Hwang	MR2863-134	5132

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ROSENBERG, KLEIN & LEE
3458 ELLICOTT CENTER DRIVE-SUITE 101
ELLICOTT CITY, MD 21043

EXAMINER

WALKER, KEITH D

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/720,527	Applicant(s) HWANG ET AL.	
	Examiner Keith Walker	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Claims 1-18 are pending examination as discussed below.

Information Disclosure Statement

The information disclosure statement filed on 1/29/07 has been placed in the application file and the information referred to therein has been considered as to the merits.

Claims Analysis

Regarding claim 14, the claims are drawn to an apparatus and it is held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations (MPEP 2114).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

Art Unit: 1745

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-4, 7, 17 & 18 are rejected under 35 U.S.C. 102(e) as being anticipated by US Publication 2004/0072046 (Schmidt).

Schmidt discloses a fuel cell apparatus consisting of a control device, a fuel cell stack with reactant inlets and outlets and electrical terminals. A battery can be provided as a load having adjustable power consumption and constant power values. The hydrogen gas supply line has a pressure regulator and the air supply pipeline has a humidifier for humidifying the air in the air pipeline (Fig. 1, 3; [0024, 0025, 0037-0041]). The casing provides the connection and display panel for connecting the control device, the load, the stack and the reactant pipes (Fig. 5 & 6; [0045-0048]). The liquid crystal display (LCD) and keyboard allow the operator to control of the fuel cell system ([0045]). The connection and display panel has a plurality of display regions providing a graphic representation of power system, the joints and display region in a coordinated manner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. As best understood, claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2004/0072046 (Schmidt) in view of US Patent 6,080,500 (Fuju).

Art Unit: 1745

The teachings of Schmidt as discussed above are incorporated herein. Schmidt teaches using loads such as personal computers and radios. These loads are considered fixed loads and it is well known in the art to use either alternating current (AC) or direct current (DC) to power loads these loads ([0004]).

Schmidt is silent to the use of a DC/AC converter.

Fuju teaches using a DC/AC converter so the direct current (DC) created by the fuel cell can be converted to an alternating current (AC), which can then be used to power a multitude of other devices (3:55-65).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the system of Schmidt with the DC/AC converter of Fuju to supply AC current to devices requiring such current.

3. Claims 6, 8-13, 15 & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2004/0072046 (Schmidt) in view of US Patent 5,605,770 (Androli).

The teachings of Schmidt as discussed above are incorporated herein.

Schmidt is silent to the use of temperature, pressure and flow sensors as well as pressure and flow regulators. Also, the use of an analog to digital converting interface is not taught.

Androli teaches a fuel cell system that operates through a controller by the input of multiple sensors. In the hydrogen line, a pressure sensor, pressure regulator, flow sensor and temperature sensor are used to control the hydrogen gas. Since the

Art Unit: 1745

hydrogen is supplied from a tank, the tank would have a valve for regulating the flow of hydrogen gas (Fig. 1 & 2; 3:30-50). The oxidant line also has a temperature, pressure and flow sensor used to report the appropriate conditions of the oxidant gas in the system. A valve is used to control the pressure of the oxidant gas (Fig. 1 & 2; 4:10-51). Temperature sensors detect the temperature of the fuel cell. All of the signals are sent using analog to digital converters (Fig. 1 & 2; 4:63-67, 6:1-45, 7:1-7). While Androli doesn't discuss the use of a flow regulating valve for the air supply, a flow sensor is used and it would be obvious to one skilled in the art to include a flow regulating valve to control the flow of air to the cathode based on the values detected by the flow sensor.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the system of Schmidt with the controlling system of Androli to create better cell efficiency by reducing the wasteful venting of gases (3:1-2).

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2004/0072046 (Schmidt) and US Patent 5,605,770 (Androli) as applied to claim 13 above and further in view of US Patent 6,649,290 (Leboe).

The teachings of Schmidt and Androli as discussed above are incorporated herein.

Schmidt and Androli are silent to connecting the cooling air with the reactant air.

Leboe teaches common pipelines to supply air as both the reactant and the coolant (Fig. 5 & 6; 6:5-50). Since the air pathways are connected, as the need for

Art Unit: 1745

more air reactant increases the cooling flow also increases (8:20-60). The combined cooling means allows for regulating the temperature of the fuel cell system components within a small physical space while ensuring exhaust gases and external surfaces of the apparatus do not exceed safe temperatures (2:35-43).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the system of Schmidt and Androli with the combined cooling means of Leboe to create a system with safe operating temperatures that has a smaller physical footprint.

5. Claims 1-13, 15, 16 & 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/067350 (Bronold).

Bronold teaches a fuel cell system demonstration board comprising a fuel cell stack, a hydrogen and air supply, heat exchanger, inverter and connection joints (Abstract). For the fuel cell to operate, the system inherently has a load and the type of load (i.e. fixed or variable) is dependent of the design of the system and it would be obvious to one skilled in the art to choose the type of load based on the design of the system.

Bronold is silent to the pressure, temperature and flow meters, sensors or regulators. However, it is well known in the art for system designs to include appropriate reactant pressure controls so the electrolytic membrane is not destroyed by the pressure differential between to the two reactants. Controlling the flow of reactants is known so the reactants are not wasted by providing more fuel than can be consumed

Art Unit: 1745

or the starving the fuel cell of reactants, which in turn can prevent the load from receiving adequate power. Since Bronold teaches heating and cooling the system, a temperature sensor would be obvious to one skilled in the art to monitor the system's temperature so it will operate in the most effective temperature range.

Bronold is silent to using a control unit or a display unit. Since Bronold's disclosure is drawn to a fuel cell demonstration system, it would be obvious to one skilled in the art to use a control unit to operate the fuel cell and display the operating and monitoring parameters such as temperature and load fluctuations.

Response to Arguments

Applicant's arguments filed 3/09/07 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues Schmidt fails to all the elements of the claimed invention, since the LCD panel doesn't have a plurality of joints for physical connections. As stated above, the casing provides the connection and display panel equivalent. The LCD panel shows various operating parameters of the system and the connections on the side provide the plurality of physical joints for the connection of components. Together

Art Unit: 1745

the connections and the LCD form "a plurality of display regions arranged in a coordinated manner" and "define a visual representation of the fuel cell stack."

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith Walker whose telephone number is 571-272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

K. Walker

MARK RUTHKOSKY
PRIMARY EXAMINER

Mark Ruthkosky 5-29-2007